

REMARKS

Applicants have amended the specification and claims 26, 30, 32, 33 and 38. No new matter has been added to the application by virtue of the present amendment.

Therefore, claims 26-38 are pending in the subject application by virtue of the present amendment. It is respectfully requested that the pending claims 26-38 be reconsidered and passed to issuance.

Objections to the Drawings

The Examiner objected to the drawings under 37 C.F.R. 1.83(a).

Regarding claim 26, Applicant respectfully submits that the drawings show every feature of the invention specified in claim 26. For example, referring to FIG. 1 of the application, FIG. 1 shows the cathode comprising a plurality of vertically abutting diffusion regions 12 and 14. Likewise, FIG. 4 shows the anode comprising a plurality of vertically abutting diffusion regions 14B and 20. Claim 26 states that "... at least one of said cathode and anode comprise ..." which indicates that at least the cathode or anode comprises a plurality of vertically abutting diffusion regions. As such, FIGS. 1 and 4 show the cathode or anode comprising a plurality of vertically abutting diffusion regions.

Regarding claim 32, the feature of the "liner" has been deleted from the claim.

Therefore, Applicant believes that the objections to the drawings have been overcome.

Objections to the Specification

The Examiner objected to the abstract of the disclosure and informalities in paragraphs [0004] and [0005].

The Applicant has made appropriate corrections as suggested by the Examiner.

Therefore, Applicant believes the objections to the specification have been overcome.

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Claim Objections

The Examiner has objected to claims 32 and 33.

Applicant has made appropriate corrections to claims 32 and 33.

Therefore, Applicant believes the objections to the claims have been overcome.

Claim Rejections – 35 U.S.C. 112, first and second paragraphs

The Examiner has rejected claims 26-38 under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement, and claims 33-34 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Regarding claim 26, and claims 27-38 dependent thereupon, Applicant respectfully submits that the disclosure adequately describes the limitation of "... at least one of said cathode and anode comprise a plurality of vertically abutting diffusion regions ...". Support for the limitation can be found in paragraphs [0035] to [0045] and in FIGS. 1-7. For example, referring to FIG. 1 of the application, FIG. 1 shows the cathode comprising a plurality of vertically abutting diffusion regions 12 and 14. Support in the written specification for FIG. 1 can be found in paragraph [0035]:

" ... A deep n+ region 12 is first formed ... Then a more shallow n- region 14 is formed by epitaxially growing silicon up from the n+ doped region 12...."
(emphasis added)

Likewise, FIG. 4 shows the anode comprising a plurality of vertically abutting diffusion regions 14B and 20. Support in the written specification for FIG. 4 can be found in paragraph [0043]:

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“... In this structure a p-region 14B is provided to enhance the performance of the ESD diode at higher voltages. This forms a p+/p-/n+ diode structure. ...”
(emphasis added)

Claim 26 states that “... at least one of said cathode and anode comprise ...” which indicates that at least the cathode or anode comprises a plurality of vertically abutting diffusion regions. As such, paragraphs [0035]-[0045] and FIGS. 1-7 describe the cathode or anode comprising a plurality of vertically abutting diffusion regions.

Regarding claims 33 and 34, Applicant has amended claim 33 to be dependent upon claim 29 in order to provide proper antecedent basis. Referring to FIG. 2 of the application, the first doped region is identified by the numeral 14 (n- doped), the second doped region is identified by the numeral 12 (n++ doped) and the third doped region is identified by the numeral 12A (n+ doped).

Therefore, Applicant believes the rejections to the claims under 35 U.S.C. 112, first and second paragraphs, have been overcome.

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Claim Rejections - 35 U.S.C. 102 (b)

The Examiner has rejected claims 26, 28, 33, 35 and 37-38 under 35 U.S.C. 102(b) as being anticipated by Beasom (U.S. Patent No. 5,841,169).

Applicant has amended claim 26 to more clearly distinguish Applicant's method over Beasom. For example, referring to FIG. 1 of the application, doped regions 12, 14 and 20 are formed on a first region of substrate 10 and, in another region of substrate 10, substrate 10 is etched to form isolation regions 16, 16A adjacent the first region. The first region where the doped regions 12, 14 and 20 are formed is not etched and remains in place during the formation of the isolation regions 16, 16A.

Beasom does not anticipate or suggest Applicant's claim 26, as amended, and claims dependent thereupon. Referring to column 4, lines 14-53 of Beasom, Beasom teaches a method of etching a single crystal substrate to remove an entire portion of the substrate to form a trench with a tapered shape. An oxide layer 209 (see FIG. 2) is then formed on sidewalls of the trench. The trench is then filled with polysilicon to form a device region within the trench. Doped regions (ie. 202, 203) are then formed in the polysilicon device region. Thus, Beasom removes an entire portion of the single crystal substrate where the doped regions are subsequently formed and fills the region with polysilicon, and then forms the doped regions in the polysilicon region. Beasom's method requires a portion of the single crystal substrate to be removed and replaced with polysilicon. Beasom is silent on forming isolation regions adjacent the region where the device (ie. doped regions) is formed without removing the region of the substrate where the device is formed.

Therefore, Applicant believes the rejections to the claims under 35 U.S.C. 102(b) have been overcome.

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Claim Rejections - 35 U.S.C. 103 (a)

The Examiner has rejected claims 29 and 31 under 35 U.S.C. 103(a) as being unpatentable over Beasom (U.S. Patent No. 5,841,169); claims 27 and 30 under 35 U.S.C. 103(a) as being unpatentable over Beasom in view of Mack et al. (U.S. Patent No. 4,736,271); claim 32 under 35 U.S.C. 103(a) as being unpatentable over Beasom in view of Takeuchi et al. (U.S. Patent No. 5,825,067); and claims 34 and 36 under 35 U.S.C. 103(a) as being unpatentable over Beasom in view of Robinson et al. (U.S. Patent No. 5,268,316).

As discussed above, Applicant respectfully submits that Beasom individually or in combination with Mack et al., Takeuchi et al. or Robinson et al. do not teach or suggest Applicant's claim 26, as amended, or claims dependent thereupon.

Therefore, Applicant believes the rejections to the claims under 35 U.S.C. 103(a) have been overcome.

Prior Art Made of Record

The prior art made of record and not relied upon, Beigel et al. (U.S. Patent No. 5,637,901) and Brennan et al. (U.S. Patent No. 6,396,107), do not anticipate or suggest Applicant's claim 26, as amended.

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CONCLUSION

In light of the foregoing amendments and remarks, all of the claims now presented are believed to be in condition for allowance, and Applicant respectfully requests that the outstanding rejections be withdrawn and this application be passed to issue at an early date.

The Examiner is urged to call the undersigned at the number listed below if, in the Examiner's opinion, such a phone conference would aid in furthering the prosecution of this application. No fee is due by virtue of this amendment. However, if the PTO determines that a fee is required, please charge Applicant's Deposit Account, 09-0456. If any extensions or fees are not accounted for, such extension is requested and the associated fee should be charged to our deposit account.

Respectfully Submitted,

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